28 September 1970

X1A MEMORANDUM TO: [redacted]

SUBJECT : Comments re Hardcopy vs. Microfilm costs

X1A FROM : [redacted]

1. Attached is a copy of subject paper with my specific remarks shown in the margins. (on Xerox copy.)

2. Additional remarks:

a. Overall - The analysis is incomplete as it stands, and thus is not reliable as a basis for final decision.

b. All assumptions and constraints not stated.

c. Presentation is difficult to follow and thus undermines reader's confidence in the results.

d. The analysis gives the impression that parts were thrown in piecemeal with possibly important consideration's not discussed.

*e. The use of minimum and maximum manpower figures is not a valid approach for costing alternatives. The given task requires a given number of manhours to perform - - and should be costed on that basis. The min/max approach is useful only with regard to T/O changes.

f. The basis for cost estimates not given -- eg. how was capital investment allocated, etc.

g. It's not clear that 6000 cu. ft. is the net growth per year; what amount is disposed of?

h. What other alternatives are possible?

i. This is a good case where discounted cash flow calculations are appropriate.

3. Conclusion: More in-depth and careful analysis is required. This study is not adequate for final decision - - too many things not clear.

C. E. R.

Roy: Re Hard Copy Copy vs Microfilm

REF: Page 6-1 Army Reg on Costs

"In general, if space and filing equipment savings are the prime consideration, records which are to be destroyed after retention for 15 years or less should not be microfilmed."

The key assumption here is the Army's "Handy-Dandy" chart (p.6-6) valid for the Agency? One might want to work out an Agency chart to precisely determine the break-even point.

With respect to the cost proposal, the first point I would challenge is the validity of the assumed net growth of files per year, i.e. 6000 cu. ft. Another curiosity, in the plan comparison, is manpower; viz, do we now have the 6 GS-3 on the payroll? If we do, 83k ought to be subtracted. The two previous points just highlight the real need in my mind for more analysis, viz, sensitivity,analysis. That is, what factors are sensitive to time, cost/cu. ft. , break-even points all resolving the issue: for our problem and problem parameters witen does it (does not) become economical to microfilm in terms of volume, cost + years of retention?

What the proposal has, so far, seems ok - I would insist on additional analysis -

Yours truly,

[redacted]TATINTL

COST COMPARISON

Hard Copy vs. Microfilm for the Storage and Maintenance of Inactive Records

1. Basis for Estimates

a. Estimates have been prepared on the existing hard copy storage plan as well as four different microfilm plans. Each microfilm plan has been compared separately with the hard copy plan. Estimates include all costs which can be directly identified or attributed to a specific plan.

STATINTL Since the new shelving [redacted] reportedly will be filled up in 6 years with inactive files, its associated costs were included in the hard copy plan.

b. The microfilm estimates attempt to show what costs are incurred when these same records are microfilmed as they become inactive and are

STATINTL stored for comparable amounts of time with the active files at Headquarters instead [redacted] Each plan assumes a net growth of inactive files of 6,000 cubic feet per year (a stack 11 times as high as the Washington Monument) is to be dealt with. Each plan is costed for documents with a 6-year minimum retention and for 10-year minimum retention. Each plan uses a 6-year accumulation of 36,000 cubic feet of records for costing, since this is the approximate capacity of the shelves. The 10-year plan includes the costs for 4 additional years of storage and file maintenance for the same 36,000 cubic feet of records

Why is there still a net growth? Disposals? What is the policy? (also see p. 3)

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[redacted]

c. The microfilm plans include costs for maximum and minimum increases in personnel. Also, optional costs are provided for the production of Diazo duplicate rolls of microfilm to provide additional protection with storage of the silver original microfilm [redacted] STATINTL and the use of Diazo at Headquarters to service requests.

2. Explanation of Cost Items

a. Storage

(1) Equipment:

(a) Shelving cost and security installation costs are directly attributable to new hard copy storage and these costs will be repeated 6 years hence, at the present rate of growth.

(a) Safe storage cost at Headquarters was computed as follows:

Safe Cost	$ 700.00
Ten-year amortization	70.00/year
Eight cubic feet of files per safe	8.75/cu. ft.
Floor space cost at Hqs., 1970	5.00/cu. ft.
TOTAL	$ 13.75/cu. ft./year
Microminiaturization Factor, 1/100	$ .14/cu. ft.

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camera operators per year with at least four rotary and eight planetary cameras in continuous operation producing an average of 24 rolls of film per day (24 cubic feet of documents per day) in order to produce the required 6,000 cubic feet per year (using 250 working days per year). An additional 10 man years annually would be required according to the 1968 Records Management Office paper for indexing, preparing the files for filming, feeding the documents to the camera operators, etc. As stated above, the writer feels that a substantial part of this work could be absorbed by the existing Agency clerical force that normally maintains these files prior to their retirement. For this reason, estimates are provided which are based on (a) a minimum increase of 2 clerical and 6 photographic personnel and (b) a maximum increase of 10 clerical and 12 photographic personnel.

e. Processing

This would include a technical inspection of each roll for density, resolution, blemishes, etc. At 50 feet per minute, the actual processing time could be as little as one or two hours per day for the 24 rolls.

COST COMPARISON I (In Dollars)

Item	Store in Hard Copy at Records Center	6 yrs. Minimum	10 yrs. Minimum	Store in Roll Microfilm at Headquarters	6 yrs. Minimum	10 yrs. Minimum
Storage						
Equipment	New shelving (6-yr. capacity) and security installation.	600,000	600,000	Safes @ $9.00/cu. ft./yr. 1/100 reduction for microfilm.	11,340	24,300
Building	Housing of records @ .32/cu. ft./yr.	40,320	86,040	Hqs. housing @ $5.00/cu. ft. 1/100 reduction for microfilm.	6,300	13,500
Relocation	Shifting and reorganizing boxes for new shelves 4 GS-3's for 1 year	20,800	20,800	NONE	---	---
File Preparation	For Retirement - Purging, boxing, shipping. Equiv. of 2 GS-3's for 6 years.	62,400	62,400	For Filming - Purging, indexing, removing from folders. 2 to 10 GS-3's for 6 years.	62,400 or 312,000	62,400 or 312,000
File Maintenance	STATINTL					
Req. inactive file	[redacted]	----------	----------	Equal, but unknown - one cancels other	----------	----------
Servicing of file.	[redacted]	252,000	540,000	Remove file from Hqs. office safe. Display on reader - Return to safe.	----------	----------
Filming	NONE	---	---	Decentralized operation. 6-12 microphotographers @ $7,384 for 6 years.	265,824 or 531,648	265,824 or 531,648
Processing	NONE	---	---	One man at $7,696 for 6 yrs.	44,152	44,152
Supplies	Boxes, 36,000 @ .12	4,320	4,320	Film, reels, cans, @ $3.00	108,000	108,000
Subtotal		979,840	1,313,560		498,016 or 1,013,440	518,176 or 1,033,600
Diazo Dup.	NONE	---	---	STATINTL Full cost including storage [redacted] $3.00/roll.	108,860	108,860
TOTAL		979,840	1,313,560		606,876 or 1,122,300	627,036 or 1,142,460

sunk cost? If already paid for - don't count unless alternative use for the space exists -

?

what about costs for at least several microfilm readers? - Such costs should be included.

[redacted] does this include capital investment needed to build extra s/p or is this just to maintain, etc.) amount accumulated in the 6 yr period

COST COMPARISON II (In Dollars)

Item	Total Cost		Total Difference Hard Copy vs. Microfilm		Annual Difference Hard Copy vs. Microfilm		Cost per Cubic Foot per Year		Average Total Cost per Year
	6-year Minimum	10-year Minimum	6-year Minimum	10-year Minimum	6-year Minimum	10-year Minimum	*6-year Minimum	**10-year Minimum	6-year Minimum
Hard Copy Stored at Records Center	979,840	1,313,560					7.70	4.80	163,306
Microfilm Stored at Headquarters									
Employing minimum additional manpower	498,016	518,176	+ 481,464	+ 795,384	+ 80,244	+ 79,538	3.95	1.91	83,002
Employing maximum additional manpower	1,013,440	1,033,600	- 33,600	+ 279,960	- 5,600	+ 27,996	8.04	3.83	168,906
Employing minimum additional manpower and adding Diazo duplicate	606,876	627,036	+ 372,604	+ 686,524	+ 62,100	+ 68,652	4.81	2.32	101,146
Employing maximum additional manpower and adding Diazo duplicate	1,121,839	1,142,460	- 142,359	+ 171,100	- 23,726	+ 17,110	9.03	4.23	186,973

* Annual increase of 6,000 cubic feet each year for 6 years = 126,000 cubic foot years.

** Annual increase of 6,000 cubic feet each year for 6 years plus 4 additional years storage = 270,000 cubic foot years.

NOTE: A plus (+) indicates a savings for the microfilm plan.
A minus (-) indicates a savings for the hard copy plan.

— strange units —!
(what has it got to do with the problem?)

Note that when more people are counted (presumably the number needed to do the job) the microfilm costs exceed the hard-copy costs.
(Recall that it's not valid to talk about minimum or maximum except in terms of T/O changes -- the task itself will require a certain number of manhours and this requirement should be the basis for costing)

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OFFICIAL ROUTING SLIP

STATINTL

TO	NAME AND ADDRESS	DATE	INITIALS
1	Mr. [redacted]		
2	702 Mag		
3			
4			
5			
6			

	ACTION		DIRECT REPLY		PREPARE REPLY
	APPROVAL		DISPATCH		RECOMMENDATION
	COMMENT		FILE		RETURN
	CONCURRENCE		INFORMATION		SIGNATURE

Remarks:

Vince: Thought you might be interested in some brief and informal comments by one of our cost-benefit systems analysts on the study!

STATINTL [redacted]

O SENDER

NO. DATE

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Kay: RE. HARD COPY VS. MICROFILM

REF p. 6-1 Army Reg on Costs.

"IN GENERAL, IF SPACE + FILING EQUIPMENT SAVINGS ARE THE PRIME CONSIDERATION, RECORDS WHICH ARE TO BE DESTROYED AFTER RETENTION FOR 15 YEARS OR LESS SHOULD NOT BE MICROFILMED."

THE KEY ASSUMPTION HERE IS THE ARMY'S "HANDY-DANDY" CHART (p. 6-6) VALID FOR THE AGENCY? ONE MIGHT WANT TO WORK-OUT AN AGENCY CHART TO PRECISELY DETERMINE THE BREAK-EVEN POINT.

WITH RESPECT TO THE COST PROPOSAL, THE FIRST POINT I WOULD CHALLENGE IS THE VALIDITY OF THE ASSUMED NET GROWTH OF FILES PER YEAR, i.e. 6000 CU.FT. ANOTHER CURIOSITY, IN THE PLAN COMPARISION, IS MANPOWER, VIZ., DO WE NOW HAVE THE 1 GS-3 ON THE PAYROLL? IF WE DO, 83K OUGHT TO BE SUBSTRACTED. THE TWO PREVIOUS POINTS JUST HIGHLIGHT THE REAL NEED IN MY MIND FOR MORE ANALYSIS, VIZ., SENSITIVITY ANALYSIS. THAT IS, WHAT FACTORS ARE SENSITIVE TO TIME, COST/CU.FT, BREAK-EVEN POINTS ALL RESOLVING THE ISSUE: FOR OUR PROBLEM + PROBLEM PARAMETERS WHEN DOES IT (DOES NOT) BECOME ECONOMICAL TO MICROFILM IN TERMS OF VOLUME, COST + YEARS OF RETENTION?

WHAT THE PROPOSAL HAS, SO FAR, SEEMS OK — I WOULD INSIST ON ADDITIONAL ANALYSIS —

YOURS TRULY,